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M/053/005

Tenneco Minerals
A Tenneco Company

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April 3, 1991

Mr. Don Ostler
Executive Secretary
Bureau of Water Pollution Control
P.O. Box 16690
Salt Lake City, UT 84116-0690

RE: Response to Order No. 6, Notice of Violations and Order Docket No. I91-03

Dear Mr. Ostler:

This letter is in response to item number 6 of the Order contained in the above referenced Notice of Violations and Order. This portion of the Order reads:

> "Show cause within five (5) days as to why the process ponds should not be neutralized, to minimize potential contamination of the ground water."

Item number 6 is apparently concerned with the fact that the primary flexible membrane liner (FML) of the three process water ponds was damaged by falling fly-rock on March 6, 1991.

Please note that Tenneco Minerals has already made all accessible repairs to the FML of all three ponds by drawing the water levels as low as possible and repairing the exposed holes. Due to the fact that 9.28 inches of precipitation has been received at the site since February 28, 1991, the amount of water in the process system, including ponds and leach pads, is such that complete dewatering of the ponds has not been possible to date.

Tenneco Minerals has tentatively scheduled the FML repairs on the process water pond to be completed by April 5, 1991 and the barren pond by April 21, 1991, weather permitting. The existing FML on both these ponds will be repaired and a new 80 mil high density polyethylene liner will be placed on top of the existing repaired liner.

Leakage through the primary FML was detected in the leak detection systems of both the barren pond and the process water pond. Solutions have not been detected in the preg pond leak detection system to date. Leakage through the primary liner of the barren pond has been reduced to the point where approximately 100 gallons of water per day are pumped from the leak detection sump. The process water pond leak detection system is being pumped at a rate of 20 gallons per minute. The contents of the process water pond are currently neutralized to approximately 0.08 ppm free cyanide and the barren pond contains about 200 ppm free cyanide. The leak detection system of the process ponds is functioning as designed. There is no evidence that there is leakage through the secondary clay liner.

For the following reasons, Tenneco Minerals believes there is no need to neutralize the process water ponds:

1) **Per Tenneco Minerals' March 19, 1991 Remedial Plan that was submitted to the Bureau, it is our intention to dewater the subject ponds and repair and re- establish the primary FML on the barren and process water ponds as soon as the current water management problem, caused by unusually wet weather, is past. If there is no additional precipitation, we would anticipate the repairs to the process water pond primary FML to be completed by April 5, 1991 and the barren pond repairs to be completed by April 21, 1991.**

Cyanide and metals cannot be readily removed from the system and neutralized within a short period of time. Our estimates indicate that it would take approximately 4 months to neutralize the existing circulating inventory to less than 0.2 ppm free cyanide (it would take even longer to neutralize to 0.2 ppm or less total cyanide, the criteria used by the Bureau). This is because the barren pond is connected to the overall leach system and neutralizing it would require neutralizing the entire system. The barren pond will in fact be removed from the circulation system for repair; however, it is more expedient to repair the pond than to neutralize its contents.

Tenneco Minerals' Remedial Plan submitted to the Bureau on March 19, 1991, states our intention to re-establish the FML in the process water pond as soon as possible and then remove the barren pond from the circulation system for the necessary repairs as soon as this can be safely done in light of excessive amounts of water in the system. Tenneco Minerals plans to remove water from the ponds through evaporation and saturation of the new ore heaps. In addition, the two new emergency storage ponds will be used as necessary to contain excess water in the system so that the water levels in the barren and process water ponds can be lowered to expedite the necessary repairs. This remedial plan can be accomplished in less than one month and will achieve the Bureau's goal to minimize any potential adverse impacts on the environment, whereas neutralization of the ponds could take up to four months.

2) **There is no evidence of any release from the secondary liner systems.**

As provided in the Construction Permit for the ponds issued on November 3, 1988, the liner system includes a secondary liner consisting of 18-inches of low permeability clay. The secondary clay liner will contain any leakage through the primary liner until repairs are completed on the primary liners. Testing and quality control records for the construction of the three process ponds indicates that the secondary clay liners were placed according to the approved specifications. These specifications were designed to result in clay secondary liners that would contain leakage in the process ponds until repairs could be completed.

We have no evidence that the water in the leak detection systems of the barren and process water ponds is leaking through the secondary clay liners. Our calculations made as part of the application process indicate that no leakage is occurring and the secondary containment system is functioning as designed.

Moreover, our visual observations of the markings on the FML of the process water pond do not indicate a decrease in water levels that would be indicative of leakage through the secondary liner.

In addition, Tenneco Minerals is currently installing three shallow monitoring wells in the vicinity of the process ponds to confirm that no leakage has occurred from the secondary liner systems. The results will be provided to the Bureau as soon as they are compiled.

For the reasons listed above, there is no evidence to indicate that there has been a release of solutions through the secondary liner.

3) **There is good evidence from recent studies of Leach Pad No. 1 that even if there were leakage through the secondary clay liners of the barren and process water ponds, the liner material and the underlying foundation soils would be expected to attenuate any cyanide contained in the leakage.**

Testing conducted by Tenneco Minerals as a part of its study of Leach Pad No. 1 shows that the clay liner material used at the project has the capacity to attenuate cyanide solutions that are more concentrated than those presently contained in the subject ponds. The clay liner of Leach Pad No. 1 was drilled in a number of locations where there was evidence of wetting of the liner with leach solutions. In locations where

the surface of the liner was wetted but not physically disturbed, the concentrations of cyanide in the liner material were below detection limits. Where the clay liner had been disturbed by the soil movement, the concentration of total cyanide was 74.4 mg/kg in the top 6 inches of liner and only 9 mg/kg in the bottom 6 inches.

It should also be noted that the Leach Pad No. 1 testing showed the fill material under the clay liner, although wetted with leach solution, did not have detectable levels of cyanide. Therefore, the materials used in the fills for the leach pads and ponds can be expected to provide additional attenuation of cyanide if there should be a leak through the secondary clay liners.

When comparing the results from Leach Pad No. 1 to the barren and process water ponds, it should be noted that the concentration of free cyanide in the leach solution of the leach pad at the time of the release was approximately 250 ppm whereas the free cyanide concentration in the barren pond is currently 200 ppm and the process water pond only 0.08 ppm.

For the above reasons, we believe even if there were leakage through the clay liner of the barren and process water ponds, it is extremely unlikely that any water leakage would result in any adverse health or environmental impact.

In light of the above, actions to neutralize the water in the barren and process water ponds should not be required. The most expedient means of minimizing the potential for groundwater contamination is to re-establish the primary FML's as soon as possible, which Tenneco Minerals is in the process of doing. If you have any questions on the above, please call me at 574-3164.

Sincerely,

Debra Brannum

Debra Brannum
Environmental Services Manager

cc: R. Johnson
K. Kluksdahl
M. Keller - Van Cott, Bagley
B. Buck - JBR Consultants
G. Toland